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Grid-tie Transfomerless Solar Inverter

RPI M6A / M8A / M10A Operation and Installation Manual

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Safety Instructions

This manual uses the following instructions for conveying important safety related information.

CAUTION !

Machine and equipment damage may occur if this hazardous situation is not avoided.

WARNING !

Death and serious injury may occur if this hazardous situation is not avoided.

Repair work on the device should ONLY be carried out by the manufacturer. No user serviceable parts inside.

In Australia, installation and maintenance work shall be conducted by qualified electrician and shall comply with Australian Regulations.

DANGER !

To avoid risk of electrical shock, do not open the solar inverter. Death and serious injury will occur if this hazardous situation is not avoided.

WARNING ! BURN HAZARD

The unit may reach very high temperatures and the device surface can become quite hot. Sufficient cooling time is necessary for optimal yield.

1.General Information

1.1. About this Manual

This manual is to provide the explanation and procedures for installing, operating, maintaining, and troubleshooting the below solar inverters: RPI M6A/ RPI M8A/ RPI M10A

1.2. Product Description

This device is a 3-phase grid-tied solar inverter which does not support off-grid functionality.

The operation of solar inverter is shown as ***figure 1-1***. Inverters convert the DC input power supplied from the PV Array into 3-phase AC output power to Grid.

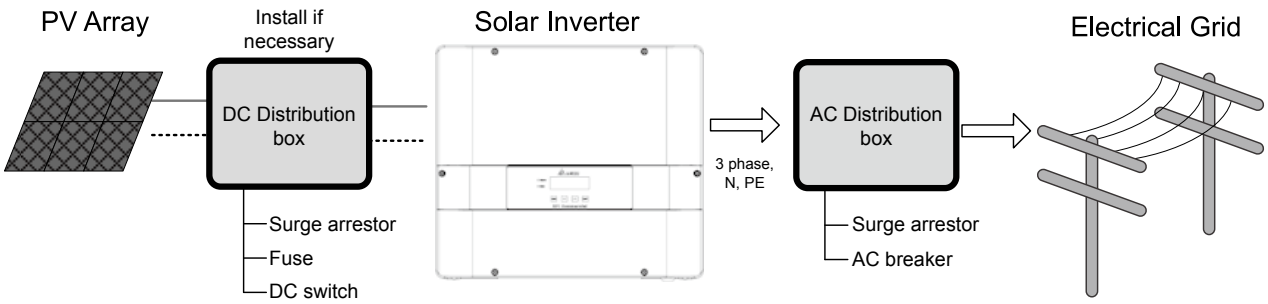


Figure 1-1 Solar system operation illustration

1.3. Additional Information

For more detailed or other related product information, please visit http://www.deltaww.com

2.Product Overview

2.1. Checking Unit and Accessories

Unpredictable damages may occur during shipment. Check if all the accessories are in the package, the standard accessories are list as Table 2-1:

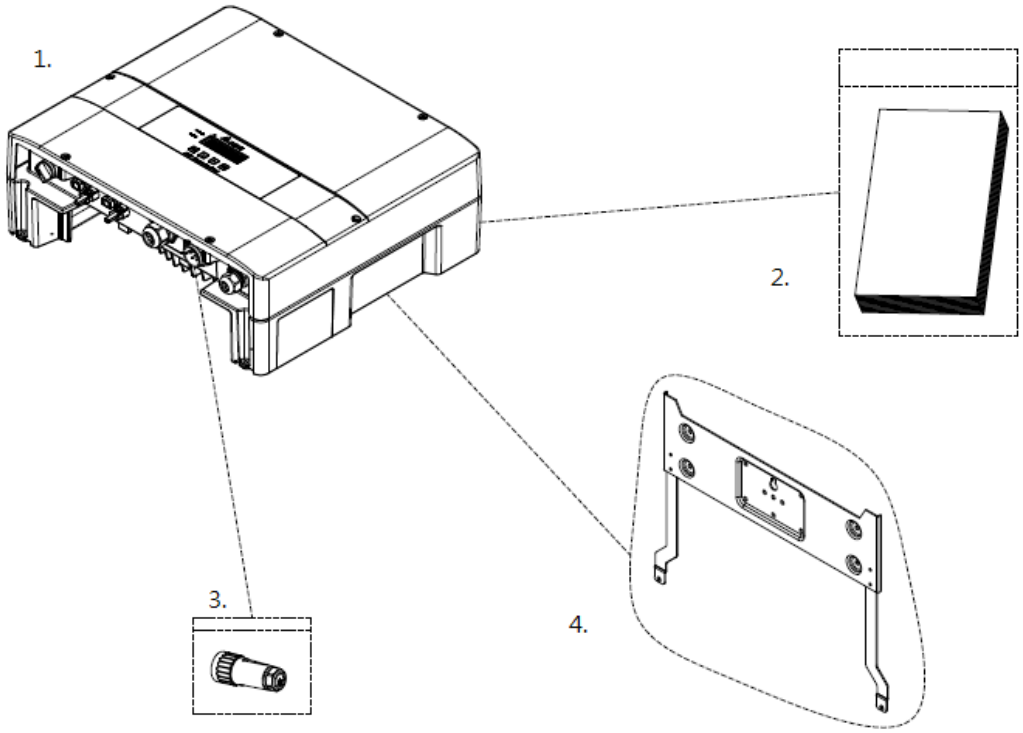


Figure 2-1 Packing listUnit

RPI M6A/ RPI M8A/ RPI M10A			
	Object	Qty	Description
1	PV Inverter	1	RPI M6A/ RPI M8A/ RPI M10A solar inverter
2	User Manual	1	The Instruction to provide the information of safety, Installation, specification, etc.
3	AC Plug	1	Connector for AC connection
4	Mounting Bracket	1	To mount solar inverters on the wall.

Table 2-1 Packing list

Remark ; If there is any visible damage to the inverter/accesories or any damage to the packaging, please contact your inverter supplier.

2.2. Product Label

Users can identify the model number and the specifications by the information on the product label. The location for the label please sees ***Figure 2-2.***

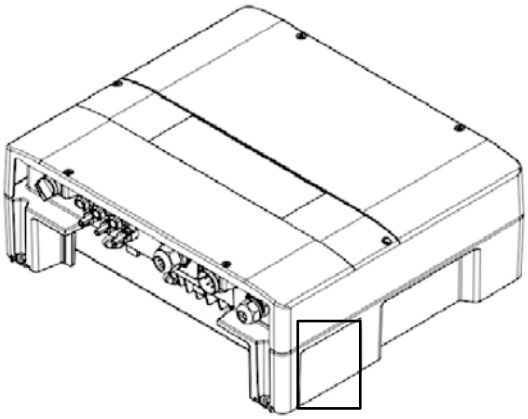


Figure 2-2 Product label

2.3. Exterior Objects

The Inverter's exterior objects are shown in ***Figure 2-3.*** The detailed input/output interfaces illustration is shown in ***Figure 2-4.***

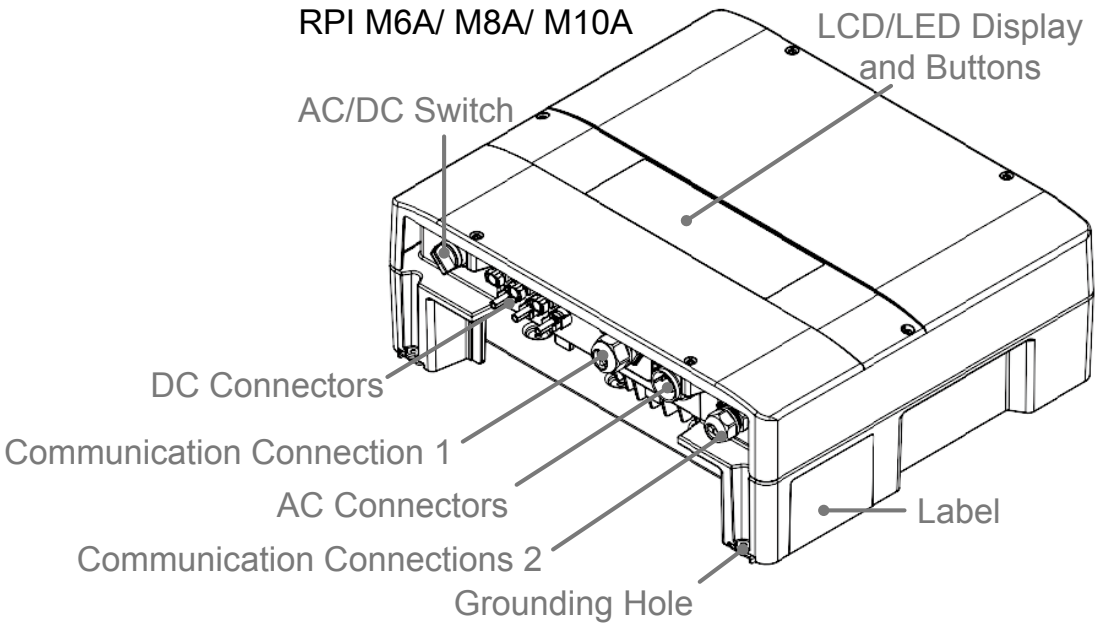


Figure 2-3 Inverter's exterior objects

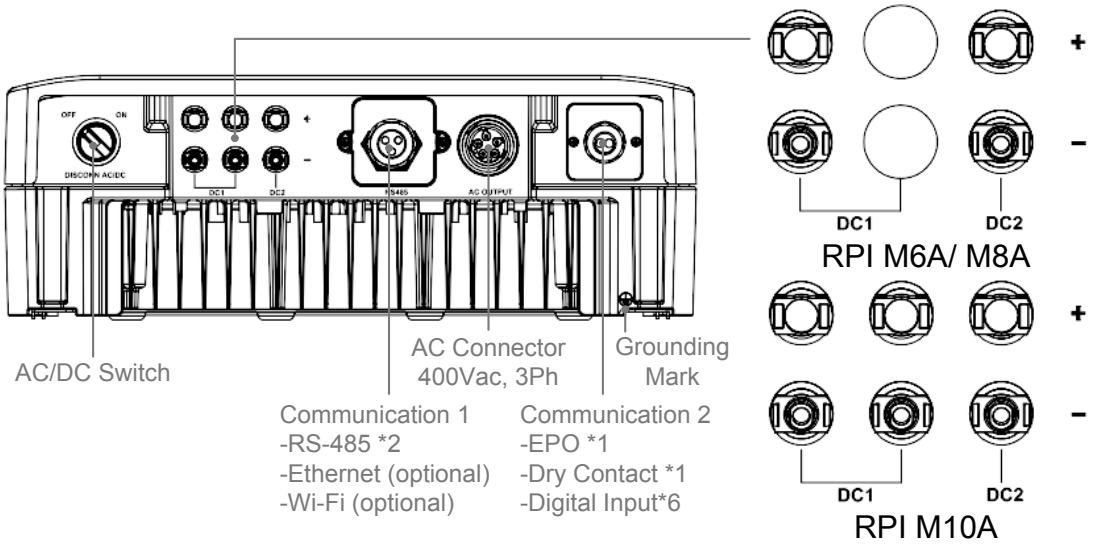


Figure 2-4 Input/output panels

3.Installation

CAUTION !

The unit should not be installed in a direct sunlight.

WARNING !

- Do not install the unit near or on flammable surfaces.
- Please mount the unit tightly on a solid/smooth surface.

3.1. Unpack the Inverter

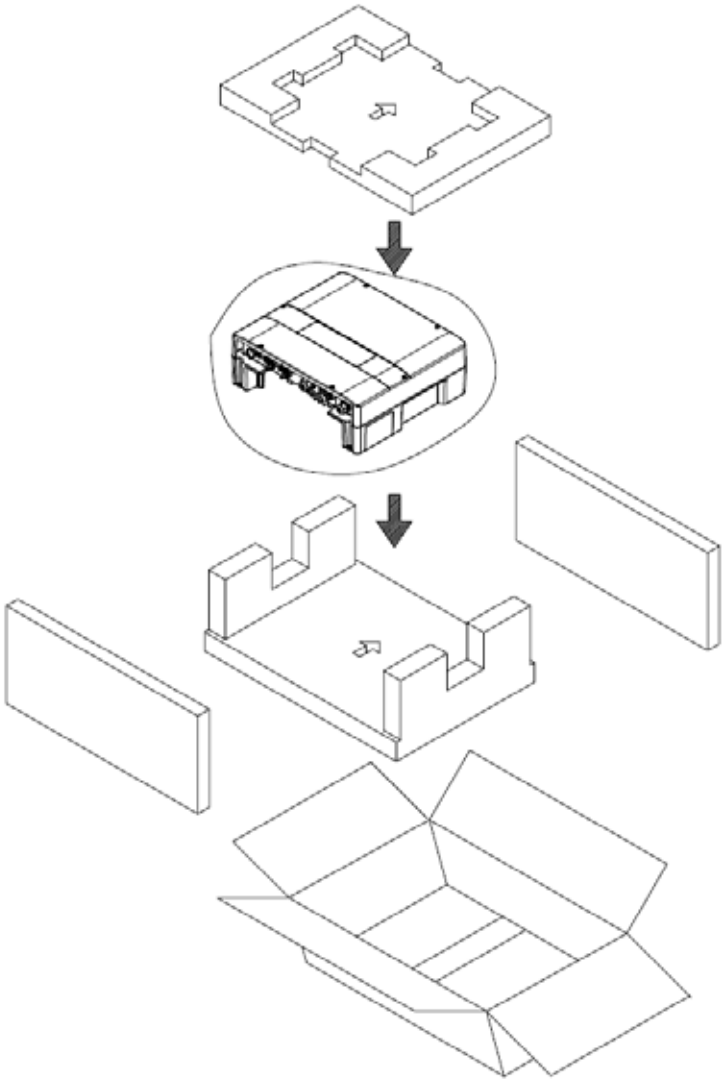


Figure 3-1 Unpacking the inverter

3.2. Mounting position

This unit is designed to be wall-mounted. Please ensure the installation is perpendicular to the floor and the AC plug at the bottom. Do not install the device on a slanting wall. Fix the supplied wall-mount plate securely on the wall before attaching the inverter onto the mounting plate.

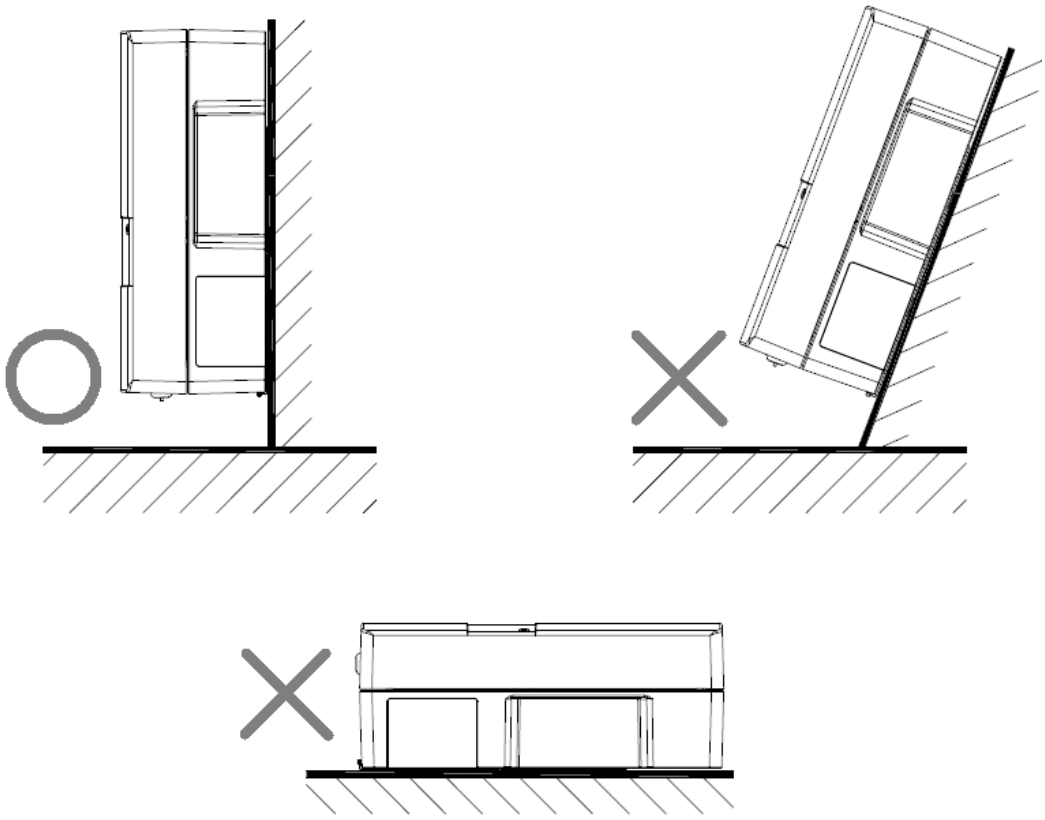


Figure 3-2 Correct and incorrect installation

3.3. Mounting braket Dimension

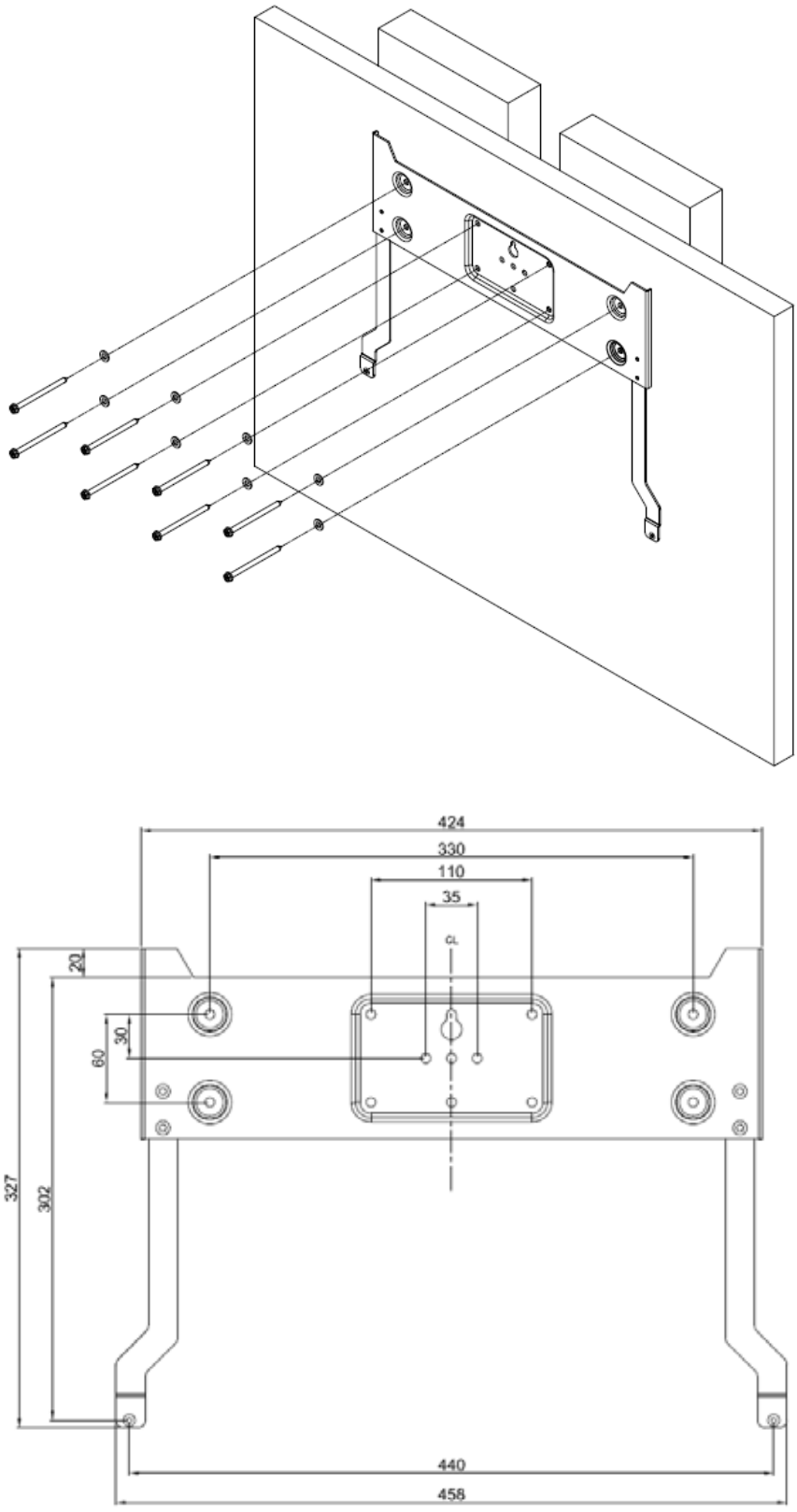


Figure 3-3 Mounting bracket demension

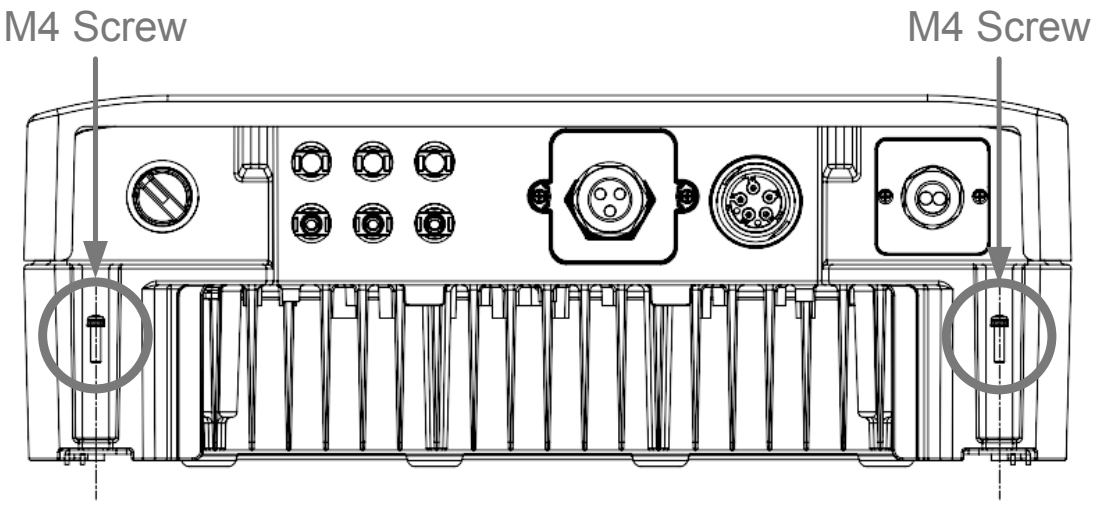


Figure 3-4 Attach inverter to the bracket and fasten with screws

CAUTION !

- The bracket supplied with the unit is specially designed and should be the only mounting device used for the unit.
- It is recommended to install the inverter in a suitable location which offers non-obscured and safe access, in turn ensuring easy access for service and maintenance.
- Please leave an appropriate gap in between units when installing several solar inverter systems as shown in Figure 3-5.
- Please install solar inverter at an eye level to allow easy observation for operation and parameter setting.
- Ambient temperature -25° C~60° C.(power de-rating above 40° C)

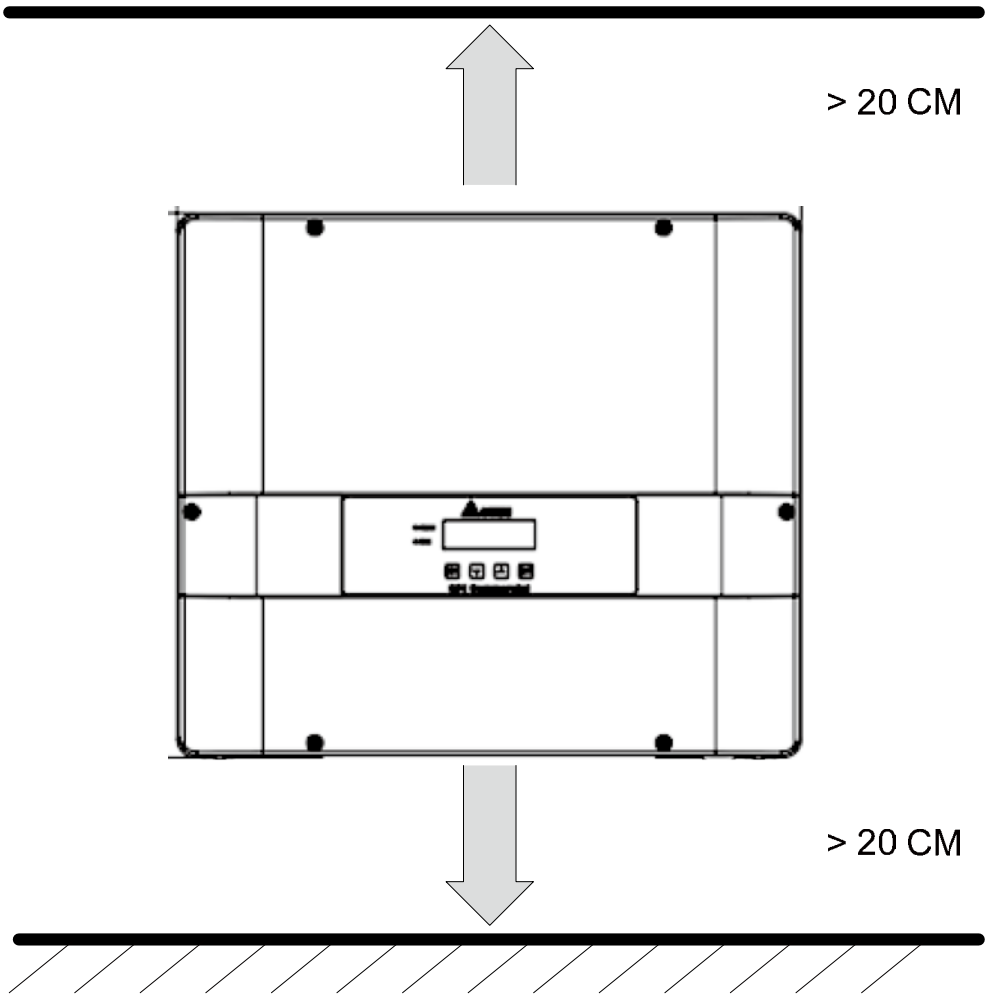


Figure 3-5 Proper installation gap

4.Wiring

4.1. Preparation before Wiring

- When grounding the solar array, an isolation transformer is required due to the RPI M6A/ M8A/ M10A not having galvanic isolation between the DC-input and AC-output. Wiring illustrations please refer to Figure 4-1.
- Inverters provide DC inputs in parallel (2 MPP tracker/ 3 parallel inputs).
- Different DC connections type need different settings of insulation detection.

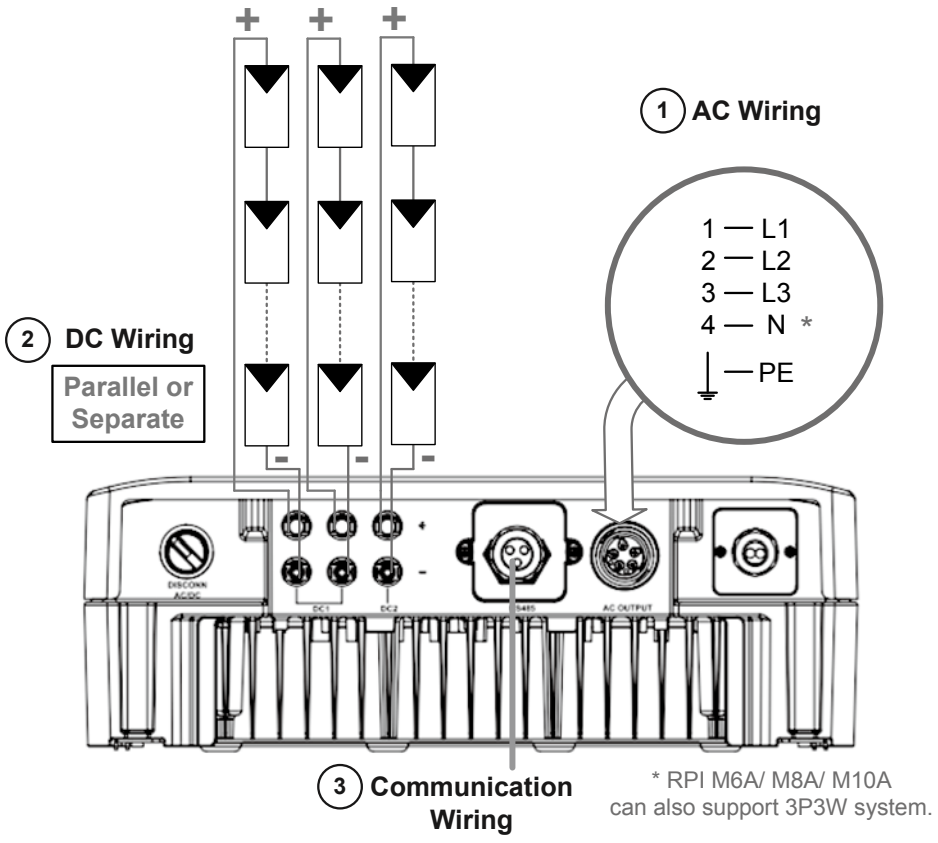


Figure 4-1 Connection of a system for floating solar array

WARNING ! SHOCK HAZARD
Whenever a PV array is exposed to sunlight, a shock hazard may exist due to output wires or exposed terminals. To reduce the risk of shock during installation, cover the array with an opaque (dark) material and ensure that the Disconnect Device in the inverter is set to OFF before commencing any wiring.

4.2. AC Grid Connection: 3-Phase+PE or 3-Phase+N+PE

WARNING !

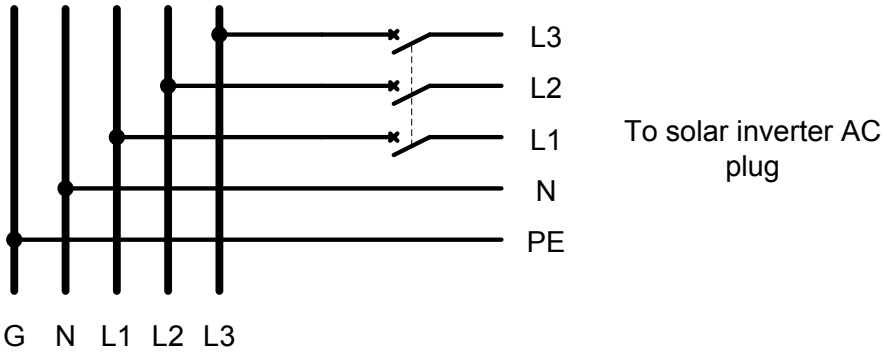
Before commencing AC wiring, please ensure AC breaker is switched off.

4.2.1. Required Protective Devices and Cable Cross-sections

It is recommended to install an upstream circuit breaker between AC side and inverter side for over current protection.

Model	Upstream circuit breaker
RPI M6A/ M8A/ M10A	20A

Table 4-1 Recommended upstream protection



The AC cable must be jacked and meet the specifications in table 4-2.

Model	Current Rating	Wire size	Recommended Torque
RPI M6A RPI M8A RPI M10A	25 A	5 - 8 mm2	0.7 N ·· m

Table 4-2 AC input cable requirement

Model M6A/ M8A/ M10A supports both 3P3W (3-phase and PE) and 3P4W (3-phase, N, and PE).

CAUTION ! Machine and equipment damage may occur.

- Make sure to choose proper size for AC cable. Please choose the terminals as shown in figure 4-2 for wires crimping.
- Failed to follow these instructions may cause AC plug damage.

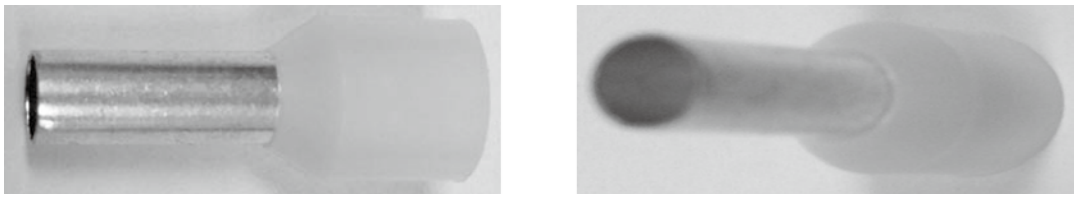


Figure 4-2 Terminal for wire crimping

Follow the steps below to strip the wires before assembling the AC plug as shown in Figure 4-3:

- Remove 55 mm (2.2 inch) of AC cable outer jacket.
- Trim the L1, L2, L3, and N wire to 52.5 mm (2.0 inch).
- Strip 12 mm (0.5 inch) of insulation from all wires ends.
- Crimp terminals for all wires.

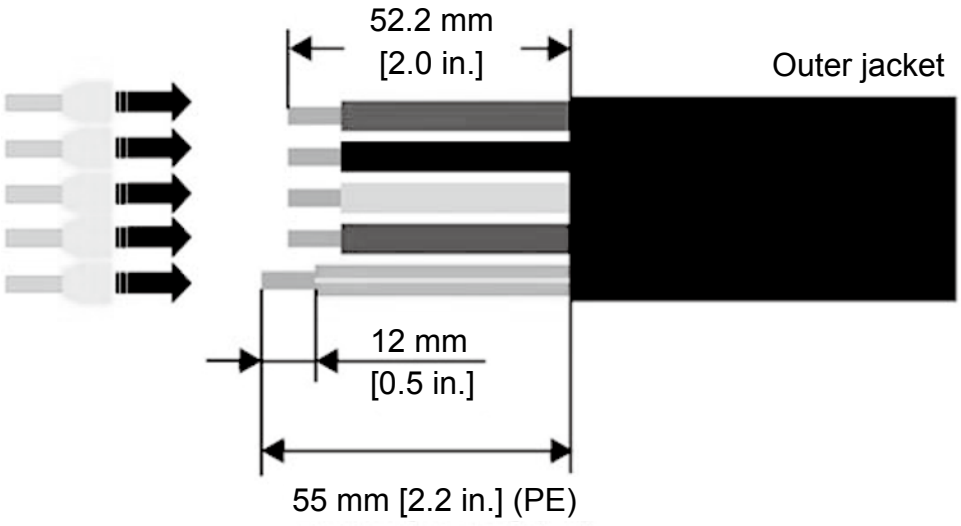


Figure 4-3 Striping the wires

Assemble the AC plug and wires as the procedures shown in ***figure 4-4.*** The sequence of L1~ L3 can be random. However, N and PE must be connected correctly.

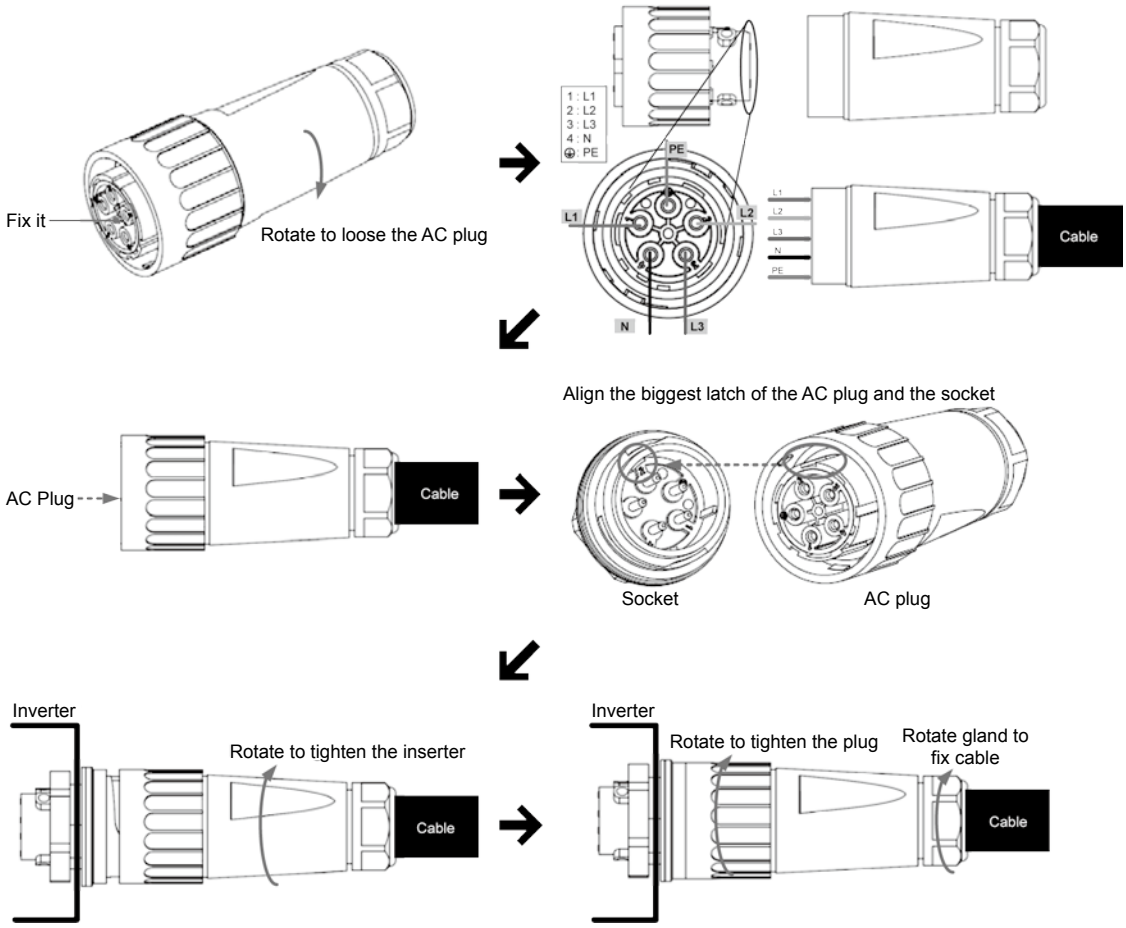


Figure 4-4 AC plug illustration for RPI M6A/ M8A/ M10A.

After wiring, installer should choose the AC connection type on the control panel. About setting, please refer to **5.3.6 Install Settings.**

The AC voltage should be as followings:

3P3W	3P4W
L1-L2: 400 Vac ± 10%	L1-N: 230 Vac ± 10%
L1-L3: 400 Vac ± 10%	L2-N: 230 Vac ± 10%
L2-L3: 400 Vac ± 10%	L3-N: 230 Vac ± 10%

4.3. DC Connection (from PV Array)

WARNING !

- When undertaking DC wiring, please ensure the correct polarities are connected.
- When undertaking DC wiring please ensures that the power switch on the PV array is OFF.

CAUTION !

- The connection number of PV Array, open circuit voltage and power of all strings in DC1 must be coherent.
- The maximum open circuit voltage of PV Array cannot exceed 1000V.
- Any device installed between PV Array and inverter must meet the following specifications:
  Rated voltage > open-circuit voltage of PV Array.
  Rated current > short-circuit current of PV Array.
- The input power to the inverter should not higher than the rated power shown in table 4-3.

Type of limit	RPI M6A	RPI M8A	RPI M10A
Total input power	6.5 kW	8.6 kW	10.8 kW
DC1 / DC2	3.25 kW / 3.25 kW	4.3 kW / 4.3 kW	7.1 kW / 3.6 kW

Table 4-3 Maximum rating of input power

Model	Current Rating	Wire size
M6A	DC 10A	2 - 3mm^2 / 14 AWG
M8A	DC 10A	2 - 3mm^2 / 14 AWG
M10A	DC 15A	3 - 5mm^2 / 12 AWG

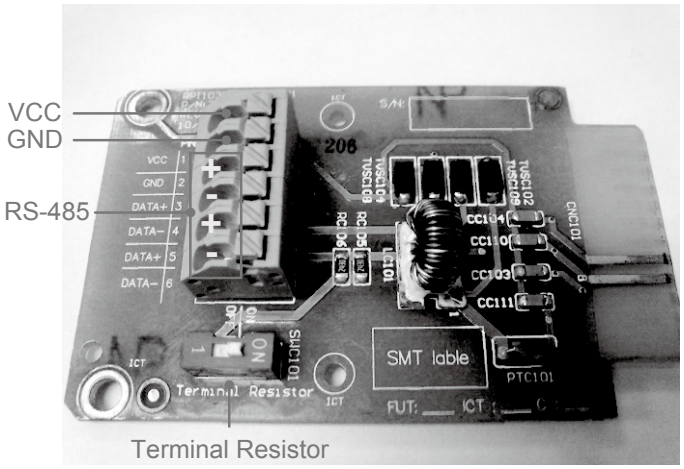
Table 4-4 Cable size

DC wiring polarities are divided into positive and negative, which is shown in ***Figure 4-5.*** The connection shall be coherent with the indication marked on inverter.

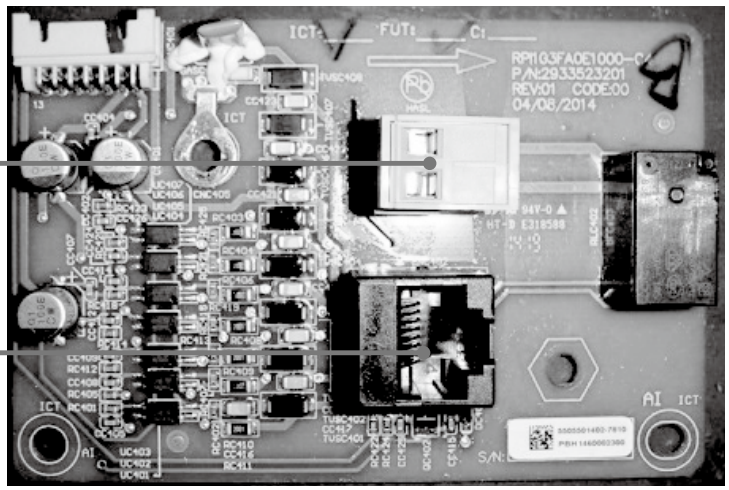
Figure 4-5 DC Plug Wiring illustration

4.4. Communication Module Connections

The Communication Module illustration please see ***figure 4-6***, the module supports a RS-485 terminal for communication with a computer.



Communication 1



Communication 2

Figure 4-6 Communication module

4.4.1. RS-485 Connection

The pin definition of RS-485 is shown in table 4-5. Installers should switch ON the terminal resistor when single inverter is installed. The wiring of multi-inverters connection is shown as ***figure 4-7.*** Installers should switch ON terminal resister at the first and last devices of the RS485 chain as shown. The other terminal resisters should be switched OFF.

Pin	Function
1	VCC (+12V)
2	GND
3	DATA+
4	DATA-
5	DATA+
6	DATA-

RPI M6A/ M8A/ M10A

Table 4-5 Definition of RS 485 pin

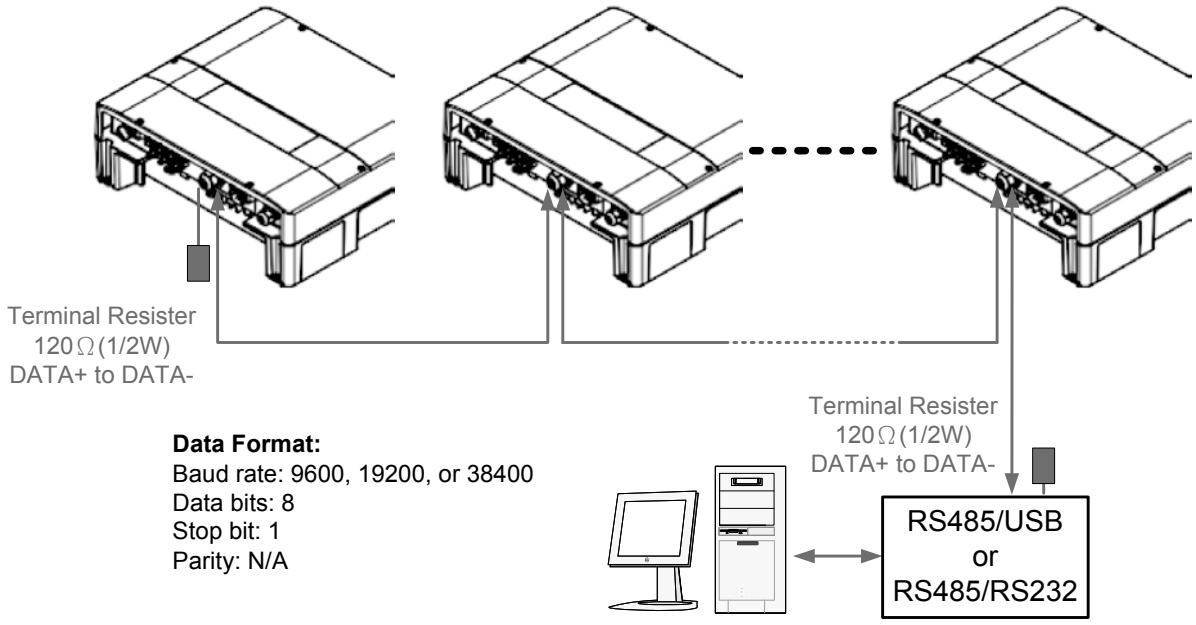


Figure 4-7 Multi-inverter connection illustration

4.4.2. Digital Input & EPO Functions

Communication Module provides 6 sets of digital input function(K1~K6) and 1 set of emergency power off function (EPO). When the outer external switch is short-circuited, the inverter will reduce power or shutdown immediately.

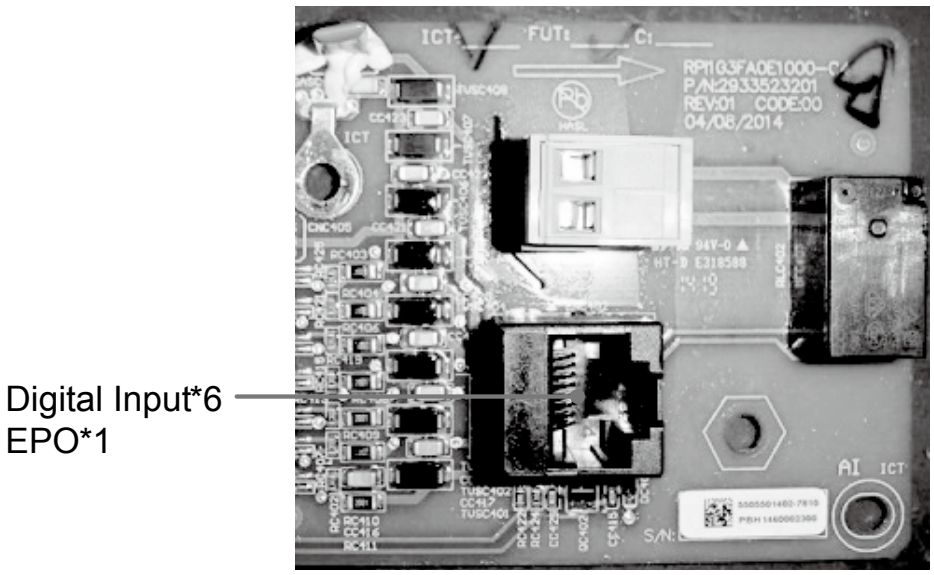


Figure 4-8 EPO functions

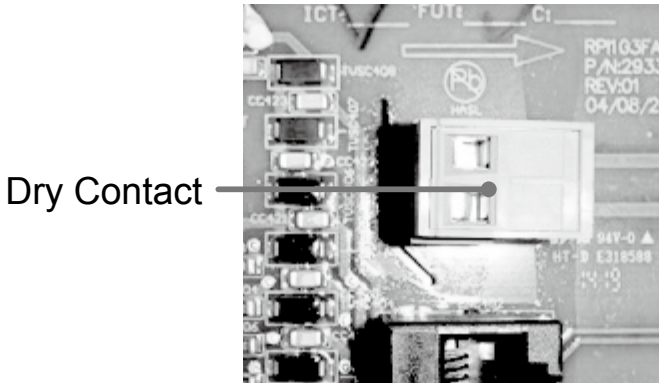
Pin	Define
1	K1
2	K2
3	K3
4	K4
5	K5
6	K6
7	EPO
8	VCC

Short	Inverter’ s action
VCC & K1	No active power
VCC & K2	Maximum 30% active power
VCC & K3	Maximum 60% active power
VCC & K4	Full active power
VCC & K5	Reserved
VCC & K6	Reserved
VCC & EPO	Emergency power off

Table 4-6 Definition of digital input & EPO functions

4.4.3. Dry Contact Connection

RPI M6A/ M8A/ M10A provide 1 set of Dry Contact function. When inverter is on grid, these two pins will be short-circuited.



RPI M6A/ M8A/ M10A

Figure 4-9 Dry contact port

5.Turn on/off PV inverter

WARNING ! BURN HAZARD
The enclosure temperature may exceed 70 ° C while inverter is operation. A dangerous burn hazard is present in this situation.

5.1. First startup

Turn AC power switch ON in AC distribution box, AC power can be fed into inverter. LCD display will be lighting up and then asking users to select Language and Country as shown in Figure 5-2. After these two items set correctly, LCD display will enter home page (Figure 5-3). Make sure "status:" showing no errors or faults on home page. Users can turn the DC switch ON. When enough power is generated from the PV array, the device will initially self-test which may take about 2 minutes. After it is done, inverter will start to feed in power to grid.

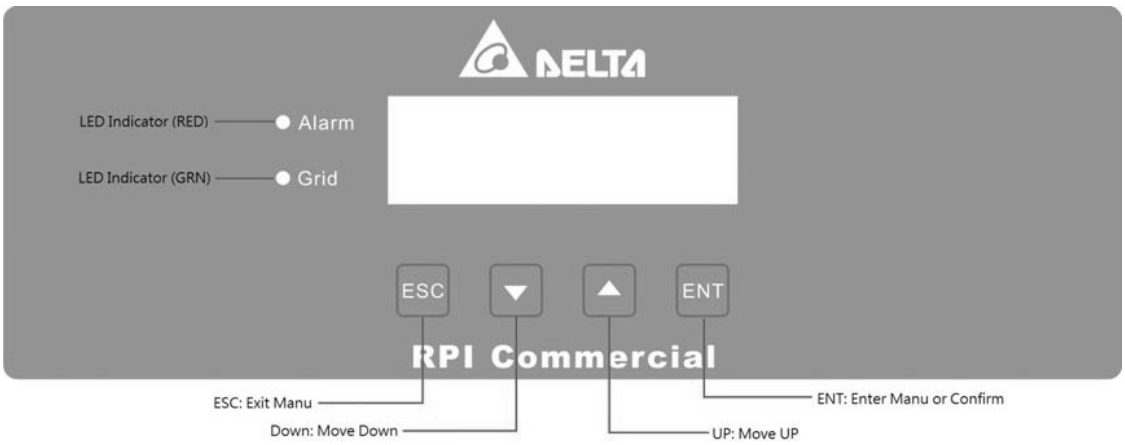


Figure 5-1 panel indicator

Condition	Green LED	Red LED
Standby or Countdown	FLASH *1	OFF
Power ON	ON	OFF
Error or Fault	OFF	ON
Night time (No DC)	OFF	OFF
Bootloader mode	FLASH *2	

*1 ON 1s / OFF 1s
*2 ON 1s / OFF 1s, Green and Red are interleaving

Table 5-1 LED indicator

First Startup

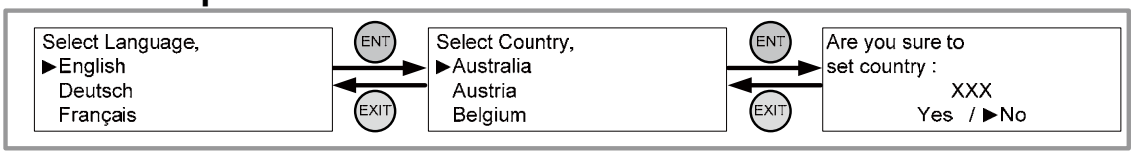


Figure 5-2 Country and language settings for first startup

5.2. Home Page

When inverter is operating normally, the LCD will display homepage as shown in Figure 5-3, user can get the information of output power, inverter status, E-today, date and time.

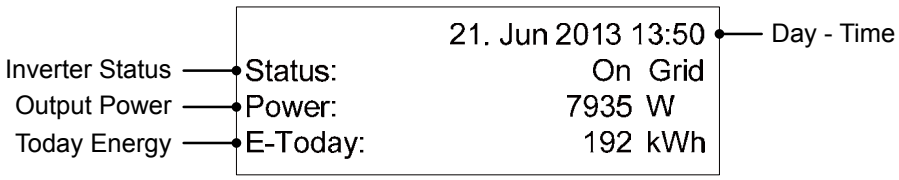


Figure 5-3 Home page for M6A/ M8A and M10A

5.3. LCD Flow Chart

Press EXIT to enter menu page (shown as Figure 5-4). The option "E-today" is homepage.

Meter	5.3.1
Energy Log	5.3.2
Event Log	5.3.3
Inverter Information	5.3.4
General Setting	5.3.5
Install Setting	5.3.6
Active/Reactive Power	5.3.7
FRT	5.3.8

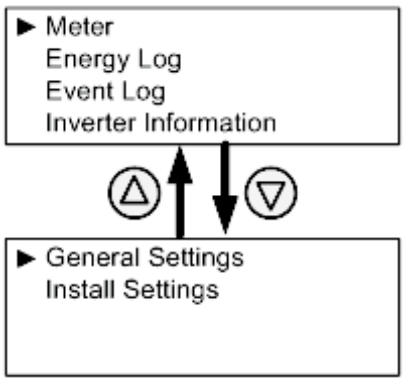


Figure 5-4 Menu page

5.3.1. Power Meter

This page displays voltage, current and power from both AC and DC side.

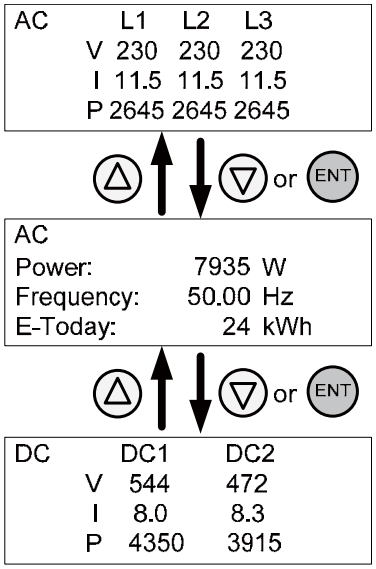


Figure 5-5 Power meter page

5.3.2. Energy Log

Press ENT to view the historical data on the power generated.

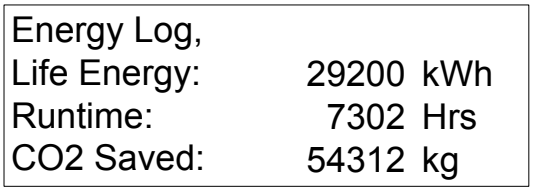


Figure 5-6 Energy log flow chart

5.3.3. Event Log

This page displays all error or fault events and it can show 30 records at a time. The latest event will be showed on the top.

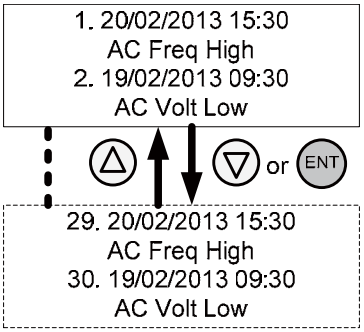


Figure 5-7 Event log flow chart

5.3.4. Inverter Information

This page has the following information: serial number, firmware version, inverter ID, country, insulation setting. If user wants to change inverter ID, please refer to **5.3.6 Install Settings.**

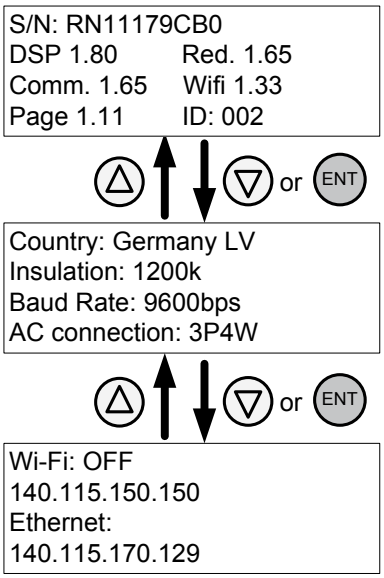


Figure 5-8 Inverter information page

5.3.5. General Settings

Language, date, time, and Wi-Fi ON/OFF can be set in the General Settings.

Figure 5-9 General Settings page

5.3.6. Install Settings

CAUTION !

The following settings can only be adjusted by installers. Changing these settings may result in damage to the inverter and other equipments.

- Insulation: Inverter will measure the impedance between the Array and PE before connecting to grid. If the impedance is lower than the value that is set in Insulation page, inverter will stop connecting to grid. There are 6 modes users can select in Insulation settings: ON, DC1 Only, DC2 Only, Plus Grounded, Minus Grounded, and OFF. After an analysis has been made for the site, the impedance should be set to best suit the environment of the installation.
- AC connection: Depending on the site conditions, the two systems available are 3P3W and 3P4W.

A password is required to enter Install Settings page. This page includes Inverter ID, Insulation, Country, and AC connection settings.

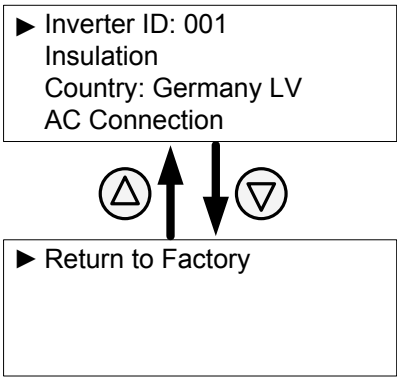


Figure 5-10 Install Settings page

5.3.7. Active/Reactive power

A password is required to enter Active/Reactive Power page. This page includes two kinds of function: active power control and reactive power control. In active power control function, there are 3 control modes: Power Limit, Power vs. Frequency, and P(V). In reactive power control function, there are 4 control modes: Constant cosphi, cosphi(P), Constant Q, and q(V). These modes will be introduced in next section.

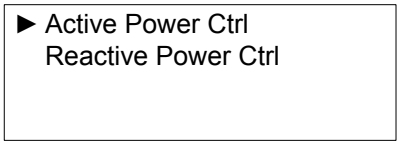


Figure 5-11 Active/Reactive power page

5.3.7.1 Power Limit

This control mode can reduce the output power to a percentage of inverter' s rated power. Users can limit the output power by set the Set Point in Power Limit page.

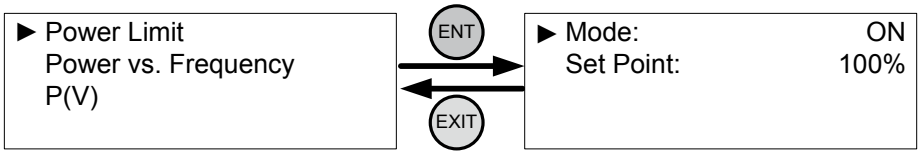


Figure 5-12 Power Limit page

5.3.7.2 Power vs. Frequency

Inverter will reduce output power when grid frequency rises up if this mode enabled. Users can tune the parameters in Power vs. Frequency page to change the inverter' s behavior.

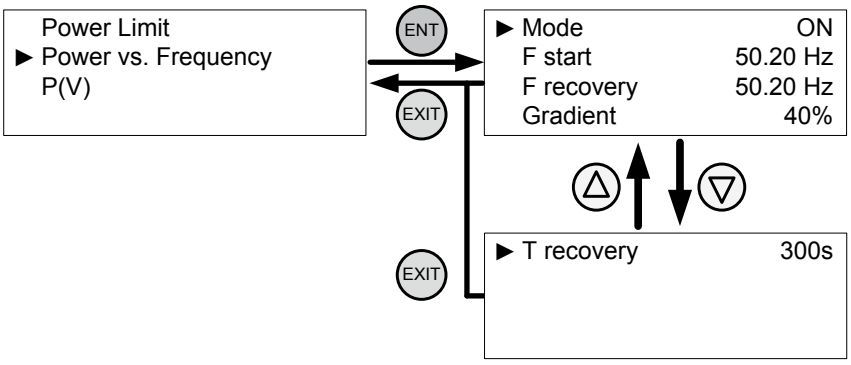


Figure 5-13 Power vs Frequency page

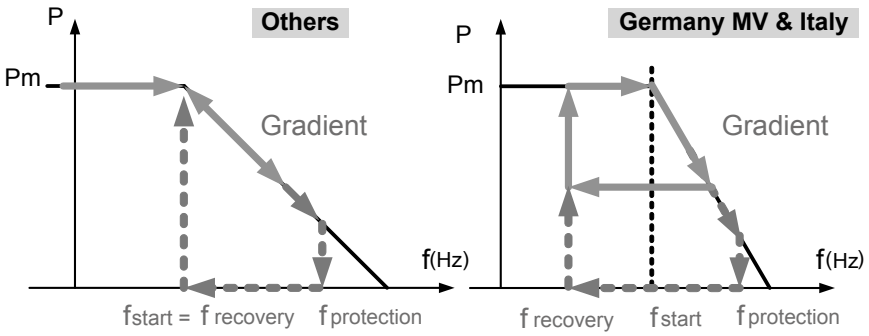


Figure 5-14 Power vs Frequency parameters

5.3.7.3 P(V)

When grid voltage rises up to a lock-in voltage(V lock-in) and inverter' s present output power is greater than lock-in power(P lock-in), inverter will reduce the output power and keep it at a certain value(P lock-out) until grid voltage drop back to lock-out voltage(V lock-out) and passing a certen time(T revcovery).

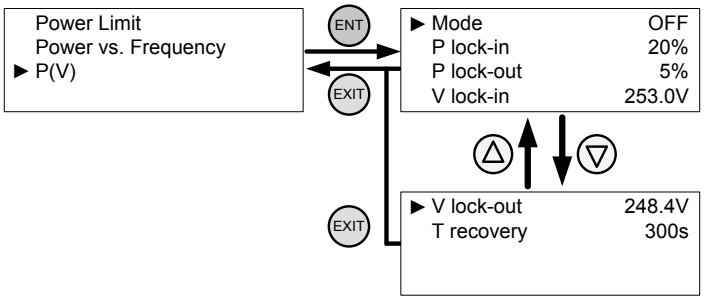


Figure 5-15 P(V) page

5.3.7.4 Constant cosphi

Inverter can feed in a fixed reactive power to grid. Users can set the power factor(cosphi) in Constant cosphi page.

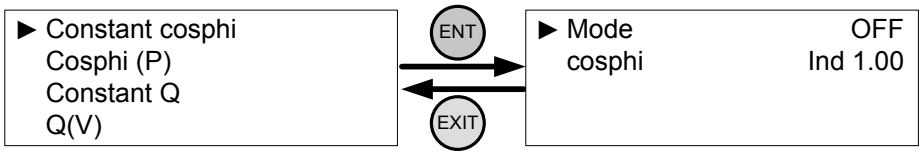


Figure 5-16 Constant cosphi page

5.3.7.5 Cosphi (P)

Cosphi (P) is a function that inverter will feed in reactive power when its output active power reach the setting values. For country Italy MV and Italy LV, users can set lock-in voltage and lock-out voltage to assign the operation interval. When grid voltage reach the lock-in voltage(V lock-in), inverter will enable cosphi (P) function automatically and disabled it when grid voltage reach lock-out voltage(V lock-out).

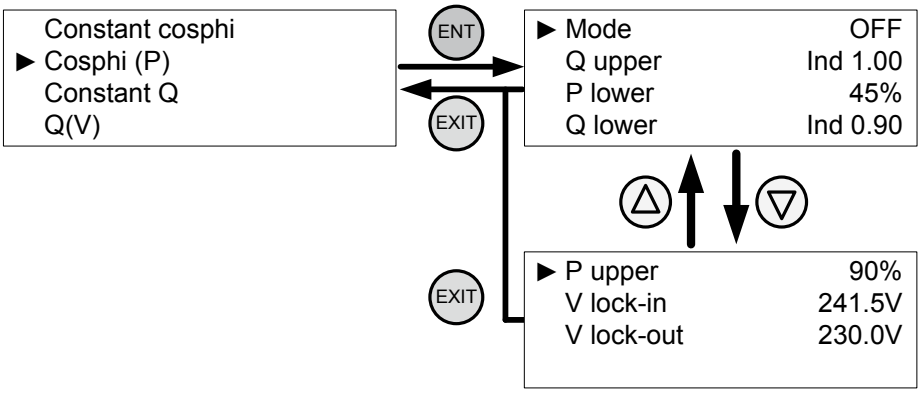


Figure 5-17 Cosphi (P) page

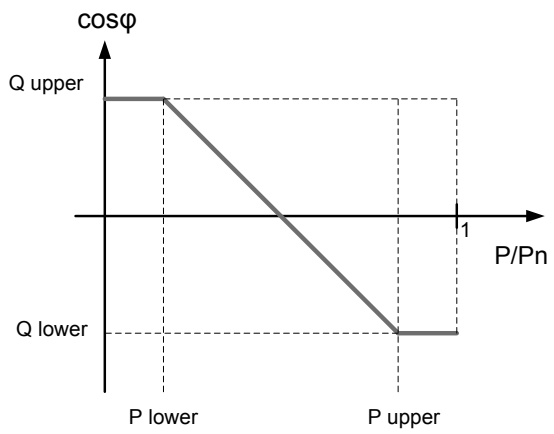


Figure 5-18 Cosphi (P) parameters

5.3.7.6 Constant Q

Like Constant cosphi function, users can assign a percentage of reactive power in Constant Q page.

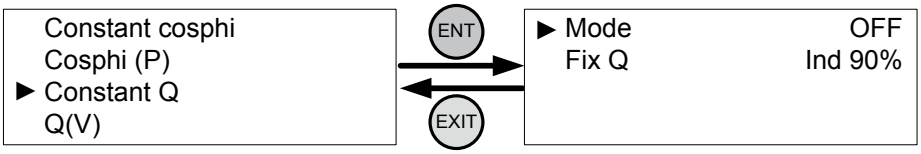


Figure 5-18 Cosphi (P) parameters

5.3.7.7 Q(V)

Q(V) is a control mode that inverter will provide reactive power accroding to grid voltage. For country Italy MV and Italy LV, users can set lock-in power and lock-out power to assign Q(V) function operation interval.

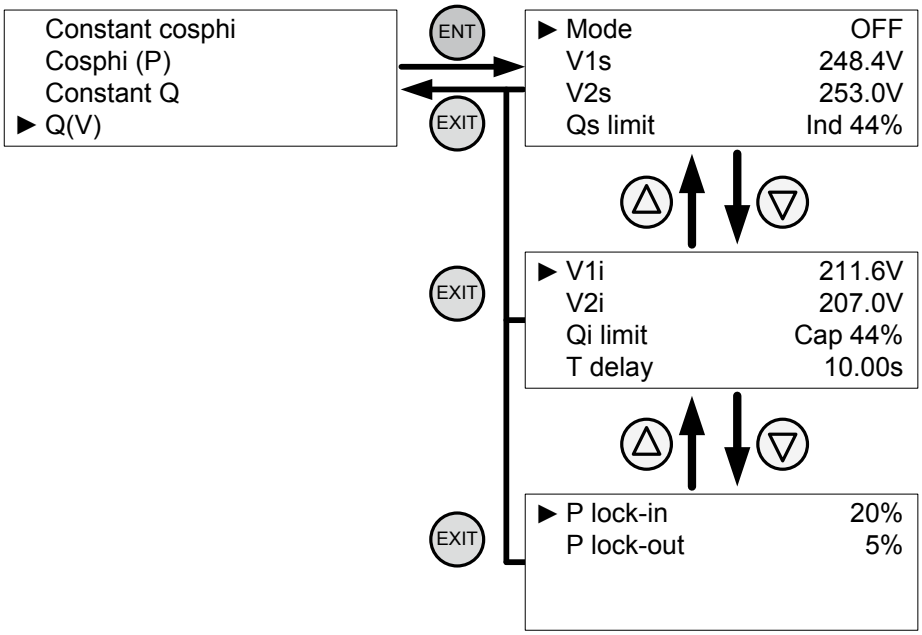


Figure 5-19 Q(V) page

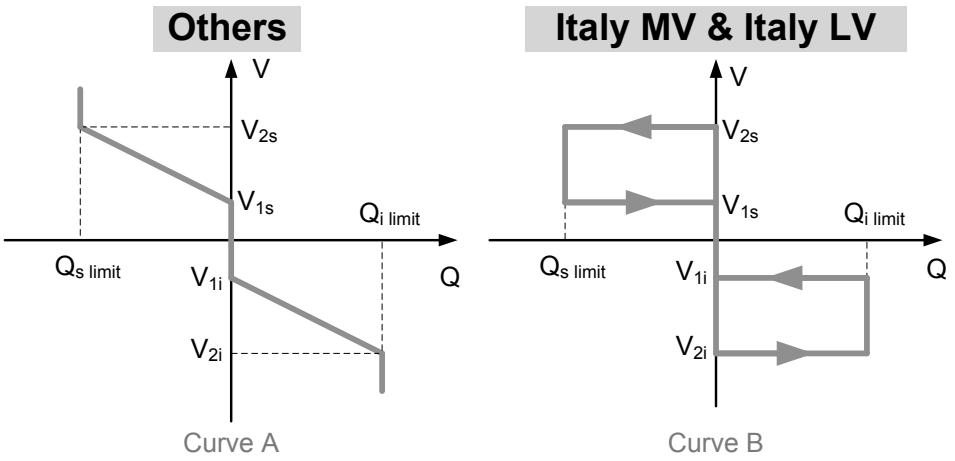


Figure 5-20 Q(V) parameters

5.3.8. FRT (Fault ride through)

Some area requests that inverter should keep connected to grid when grid voltage drops suddenly in few seconds. In these areas, users can enable FRT function and adjust the parameters to meet the requirement.

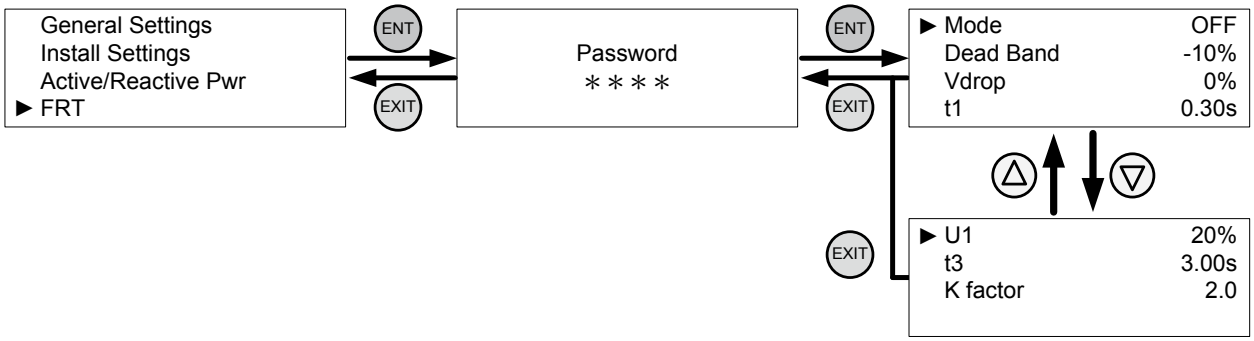


Figure 5-21 FRT page

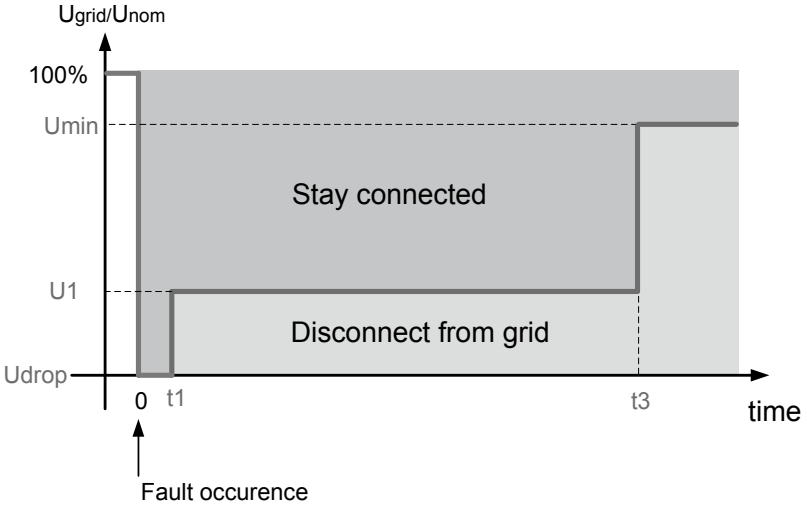


Figure 5-22 FRT Parameters

6.Maintenance

In order to ensure normal operation of the inverter, please check the unit regularly. Check that all terminals, screws and cables are connected and appeared as they did upon installation. If there are any impaired or loose parts, please contact your solar installer.

Ensure that there are no foreign objects in the path of the heat outlet and keep the unit and its surroundings clean and tidy.

Warning ! Electric Shock
Before any maintenance, please switch AC and DC power off to avoid risk of electric shock.

7.Error message and Trouble Shooting

ERROR		
Message	**Possible cause**	**Action**
AC Freq High	1. Actual utility frequency is over the OFR setting 2. Incorrect country setting 3. Detection circuit malfunction	1. Check the utility frequency on the inverter terminal 2. Check country setting 3. Check the detection circuit inside the inverter
AC Freq Low	1. Actual utility frequency is under the UFR setting 2. Incorrect country or Grid setting 3. Detection circuit malfunction	1. Check the utility frequency on the inverter terminal 2. Check country & Grid setting 3. Check the detection circuit inside the inverter
Grid Quality	Non-linear load in Grid and near to inverter	Grid connection of inverter need to be far away from non-linear load if necessary
HW Connect Fail	1. Wrong connection in AC plug 2. Detection circuit malfunction	1. Check the AC connection, must accords to manual 2. Check the detection circuit inside the inverter
No Grid	1. AC breaker is OFF 2. Disconnect in AC plug	1. Switch on AC breaker 2. Check the connection in AC plug and make sure it connects to inverter
AC Volt Low	1. Actual utility voltage is under the UVR setting 2. Incorrect country or Grid setting 3. Wrong connections in AC plug 4. Detection circuit malfunction	1. Check the utility voltage connection to the inverter terminal 2. Check country & Grid setting 3. Check the connection in AC plug 4. Check the detection circuit inside the inverter
AC Volt High	1. Actual utility voltage is over the OVR setting 2. Utility voltage is over the Slow OVR setting during operation 3. Incorrect country or Grid setting 4. Detection circuit malfunction	1. Check the utility voltage on the inverter terminal 2. Check the utility voltage on the inverter terminal 3. Check country & Grid setting 4. Check the detection circuit inside the inverter

ERROR		
Message	**Possible cause**	**Action**
Solar1 High	1. Actual Solar1 voltage is over 1000Vdc 2. Detection circuit malfunction	1. Modify the solar array setting, and make the Voc less than 1000Vdc 2. Check the detection circuit inside the inverter
Solar2 High	1. Actual Solar2 voltage is over 1000Vdc 2. Detection circuit malfunction	1. Modify the solar array setting, and make the Voc less than 1000Vdc 2. Check the detection circuit inside the inverter
Insulation	1. PV array insulation fault 2. Large PV array capacitance between Plus to Ground or Minus to Ground or both. 3. Detection circuit malfunction	1. Check the insulation of Solar inputs 2. Check the capacitance, dry PV panel if necessary 3. Check the detection circuit inside the inverter

Table 7-1 Error Message

Warning		
Message	**Possible cause**	**Action**
Solar1 Low	1. Actual Solar1 voltage is under the limit 2. Some devices were damaged inside the inverter if the actual Solar1 voltage is close to "0" 3. Detection circuit malfunction	1. Check the Solar1 voltage connection to the inverter terminal 2. Check all switching devices in boost1 3. Check the detection circuit inside the inverter
Solar2 Low	1. Actual Solar2 voltage is under the limit 2. Some devices were damaged inside the inverter if the actual Solar2 voltage is close to "0" 3. Detection circuit malfunction	1. Check the Solar2 voltage connection to the inverter terminal 2. Check all switching devices in boost2 3. Check the detection circuit inside the inverter

Table 7-2 Warning Message

FAULT		
Message	**Possible cause**	**Action**
HW DC Injection	1. Utility waveform is abnormal 2. Detection circuit malfunction	1. Check the utility waveform. Grid connection of inverter need to be far away from non-linear load if necessary 2. Check the detection circuit inside the inverter
Temperature High	1. The ambient is over 60℃ (The installation is abnormal) 2. Detection circuit malfunction	1. Check the installation ambient and environment 2. Check the detection circuit inside the inverter
HW NTC1 Fail	1. Ambient temperature >90℃ or <-30℃ 2. Detection circuit malfunction	1. Check the installation ambient and environment 2. Check the detection circuit inside the inverter
Temperature Low	1. Ambient temperature is <-30℃ 2. Detection circuit malfunction	1. Check the installation ambient and environment 2. Check the detection circuit inside the inverter
HW NTC2 Fail	1. Ambient temperature >90℃ or <-30℃ 2. Detection circuit malfunction	1. Check the installation ambient and environment 2. Check the detection circuit inside the inverter
HW NTC3 Fail	1. Ambient temperature >90℃ or <-30℃ 2. Detection circuit malfunction	1. Check the installation ambient and environment 2. Check the detection circuit inside the inverter
HW NTC4 Fail	1. Ambient temperature >90℃ or <-30℃ 2. Detection circuit malfunction	1. Check the installation ambient and environment 2. Check the detection circuit inside the inverter
HW DSP ADC1	1. Insufficient input power 2. Auxiliary power circuitry malfunction 3. Detection circuit malfunction	1. Check the input voltage, must > 150Vdc 2. Check the auxiliary circuitry inside the inverter 3. Check the detection circuit inside the inverter

FAULT		
Message	**Possible cause**	**Action**
HW DSP ADC2	1. Insufficient input power 2. Auxiliary power circuitry malfunction 3. Detection circuit malfunction	1. Check the input voltage, must > 150Vdc 2. Check the auxiliary circuitry inside the inverter 3. Check the detection circuit inside the inverter
HW DSP ADC3	1. Insufficient input power 2. Auxiliary power circuitry malfunction 3. Detection circuit malfunction	1. Check the input voltage, must > 150Vdc 2. Check the auxiliary circuitry inside the inverter 3. Check the detection circuit inside the inverter
HW Red ADC1	1. Insufficient input power 2. Auxiliary power circuitry malfunction 3. Detection circuit malfunction	1. Check the input voltage, must > 150Vdc 2. Check the auxiliary circuitry inside the inverter 3. Check the detection circuit inside the inverter
HW Red ADC2	1. Insufficient input power 2. Auxiliary power circuitry malfunction 3. Detection circuit malfunction	1. Check the input voltage, must > 150Vdc 2. Check the auxiliary circuitry inside the inverter 3. Check the detection circuit inside the inverter
HW Efficiency	1. The calibration is incorrect 2. Current feedback circuit is defective	1. Check the accuracy of current and power 2. Check the current feedback circuit inside the inverter
HW COMM2	1. Red. CPU is idling 2. The communication connection is disconnected	1. Check reset and crystal in Red. CPU 2. Check the connection between Red. CPU and DSP
HW COMM1	1. DSP is idling 2. The communication connection is disconnected 3. The communication circuit malfunction	1. Check reset and crystal in DSP 2. Check the connection between DSP and COMM 3. Check the communication circuit

FAULT		
Message	**Possible cause**	**Action**
Ground Current	1. PV array insulation fault 2. Large PV array capacitance between Plus to Ground or Minus to Ground 3. Either side of boost driver or boost choke malfunction 4. Detection circuit malfunction	1. Check the insulation of Solar inputs 2. Check the capacitance (+ <-> GND & - <-> GND), must < 2.5uF. Install a external transformer if necessary 3. Check boost driver & boost choke 4. Check the detection circuit inside the inverter
HW Connect Fail	1. Power line is disconnected inside the inverter 2. Current feedback circuit is defective	1. Check the power lines inside the inverter 2. Check the current feedback circuit inside the inverter
RCMU Fail	1. RCMU is disconnected 2. Detection circuit malfunction	1. Check the RCMU connection inside the inverter 2. Check the detection circuit inside the inverter
Relay Test Short	1. One or more relays are sticking 2. The driver circuit for the relay malfunction	1. Replace the defective relay(s) 2. Check the driver circuit inside the inverter
Relay Test Open	1. One or more relays are abnormal 2. The driver circuit for the relay malfunction 3. The detection accuracy is not correct for Vgrid and Vout	1. Replace the defective relay(s) 2. Check the driver circuit inside the inverter 3. Check the Vgrid and Vout voltage detection accuracy
Bus Unbalance	1. Not totally independent or parallel between inputs 2. PV Array short to Ground 3. Driver for boost is defective or disconnected 4. Detection circuit malfunction	1. Check the inputs connections 2. Check the PV Array insulation 3. Check the driver circuit for boost inside the inverter 4. Check the detection circuit inside the inverter
HW Bus OVR	1. Driver for boost is defective 2. Voc of PV array is over 1000Vdc 3. Surge occurs during operation 4. Detection circuit malfunction	1. Check the driver circuit for boost inside the inverter 2. Modify the solar array setting, and make the Voc less than 1000Vdc 3. N/A 4. Check the detection circuit inside the inverter

FAULT		
Message	**Possible cause**	**Action**
AC Current High	1. Surge occurs during operation 2. Driver for inverter stage is defective 3. Switching device is defective 4. Detection circuit malfunction	1. N/A 2. Check the driver circuit in inverter stage 3. Check all switching devices in inverter stage 4. Check the detect circuit inside the inverter
HW CT A Fail	1. Test current loop is broken 2. CTP3 is defective 3. Detection circuit malfunction	1. Check the connection of CNP4 to CNM4 2. Replay CTP3 with new one 3. Check the detection circuit inside the inverter
HW CT B Fail	1. Test current loop is broken 2. CTP4 is defective 3. Detection circuit malfunction	1. Check the connection of CNP4 to CNM4 2. Replace CTP4 with new one 3. Check the detection circuit inside the inverter
HW CT C Fail	1. Test current loop is broken 2. CTP5 is defective 3. Detection circuit malfunction	1. Check the connection of CNP4 to CNM4 2. Replace CTP5 with new one 3. Check the detection circuit inside the inverter
HW AC OCR	1. Large Grid harmonics 2. Switching device is defective 3. Detection circuit malfunction	1. Check the utility waveform. Grid connection of inverter need to be far away from non-linear load if necessary 2. Check all switching devices in inverter stage 3. Check the detection circuit inside the inverter
HW ZC Fail	The detection circuit for synchronal signal malfunction	Check the detection circuit for synchronal signal inside the inverter
DC Current High	1. Switching device in boost is defective 2. Driver for boost is defective 3. Input current detection circuit malfunction	1. Check all switching device in boost 2. Check the driver curcuit for boost inside the inverter 3. Check input current detection circuit

Table 7-3 Fault Message

8.De-Commissioning

If it is necessary to put the device out of operation for maintenance or storage, please follow the instructions below.

WARNING !

To avoid injuries, please follow the procedures:

- Switch off AC circuit breaker to disconnect with electricity grid.
- Switch off DC switch to disconnect with DC source.
- Switch off the PV array switch to disconnect from the PV array.
- Use proper voltmeter to confirm that the AC and DC power are disconnected from the unit.
- Remove the AC wiring immediately to completely disconnect from electricity grid.
- Remove the DC wiring to disconnect from PV Array.
- Remove the communication module RS-485 connection from the computer connection.

Now you may unload the inverter.

9.Technical Data

	RPI M6A	RPI M8A	RPI M10A
GENERAL			
Enclosure	Powder coated aluminum		
Operating temperature	-25~60℃ , full power up to 40℃		
Operating Altitude	2000m		
Relative humidity	0 – 100% non-condensing.		
Environmental category	Outdoor, wet locations		
Protection degree	IP65 (Electronics)		
Pollution degree	II		
Overvoltage category	AC output :III, DC Input :II		
Maximum backfeed current to the array	0		
Galvanic isolation	NO		
Safety class	Class I metal enclosure with protective earth		
Weight	25kg	25kg	26kg
Dimensions(W*H*D)	510 × 445 × 117mm		
Connectors	Weather resistant connectors		
DC INPUT (Solar side)			
Maximum input power	6.6kW	8.8kW	11kW
Recommended PV power range	5.7kW–7.5kW	7.6kW–10kW	9.5kW– 12.5kW
Nominal voltage	600Vdc		
Operating voltage	200Vdc – 1000Vdc		
Startup voltage	> 250 Vdc		
Start up power	40W		
MPP tracker	Parallel inputs: 1 MPP tracker Separate inputs: 2 MPP trackers		
Absolute maximum voltage	1000Vdc		
MPPT range at Nominal Power			
Balanced inputs (50/50)	315~800Vdc	415~800Vdc	415~800Vdc
Unbalanced inputs (60/40)	-	-	415~800Vdc
Number of inputs	2 pairs MC4		3 pairs MC4
Rated current	10A * 2	10A * 2	15A / 10A
Maximum short circuit current per MPPT (Isc)	13A / 13A	13A / 13A	19.5A / 13A

	RPI M6A	RPI M8A	RPI M10A
AC OUTPUT (GRID SIDE)			
Nominal power	6kVA	8kVA	10kVA
Maximum power	6.3kVA	8.4kVA	10.5kVA
Voltage	3Ph, 230/400Vac (3phase / N / PE)		
Nominal current	8.7A	11.6A	14.5A
Maximum current	9.7A	13A	16A
Inrush current	31A / 100us	31A / 100us	31A / 100us
Maximum output fault current (rms)	13.6A	18.2A	22.4A
Maximum output overcurrent protection	11.6A	15.6A	19.2A
Frequency	50Hz model: 47 – 53Hz 60Hz model: 57 – 63Hz		
Total harmonic distortion	< 3 %		
Power factor	> 0.99 @ full power Adjustable: 0.80 leading – 0.80 lagging		
DC current injection	<0.5% rated current		
Tare loss	< 2W		
Maximum efficiency	98.3%	98.3%	98.3%
EU efficiency	97.6%	97.9%	98.0%
AC connector	3 Ph + N + PE; 3-phase AC plug that meets IP67		
Fuse	N/A. Please connect to an external protection device (1.25 rated current)		
SYSTEM INFORMATION / COMMUNICATION			
User interface	Black-on-white graphical LCD display		
	365 days data logger and real time clock		
	30 event record		
External communication	2 RS-485 connections		

		RPI M6A	RPI M8A	RPI M10A
REGULATIONS & DIRECTIVES				
CE conformity		Yes		
Grid interface		VDE0126-1-1, VDE-AR-N 4105, RD1699, CEI 0-21		
Emission		EN 61000-6-3		
Harmonics		EN 61000-3-2		EN 61000-3-12
Variations and flicker		EN 61000-3-3		EN 61000-3-11
Immunity		EN 61000-6-2		
Immunity	ESD	IEC 61000-4-2		
	RS	IEC 61000-4-3		
	EFT	IEC 61000-4-4		
	Surge	IEC 61000-4-5		
	CS	IEC 61000-4-6		
	PFMF	IEC 61000-4-8		
Electrical safety		IEC 62109-1/ -2		
MISCELLANEOUS				
Enclosure		Mounting bracket		
		Aluminum with powder coating		

Table 9-1 Specifications for RPI M6A/ M8A/ M10A

DELTA
Smarter. Greener. Together.